

1. Work requester fills out this section.

☐ Standing Work Permit

Requester: Don Lynch	Date: 7/10/2006	Ext.: 2253	Dept/Div/Group: PO/PHENIX
Other Contact person (if different from requester): Sal Marino			Ext.: 3704
Work Control Coordinator: Don Lynch		Start Date: 8/1/2006	Est. End Date: 10/31/2006
Brief Description of Work: Install MPC North Detector in MMN piston cavity			
Building: 1008	Room: IR	Equipment: MPC	Service Provider: PHENIX

2. WCC, Requester/Designee, Service Provider, and ES&H (as necessary) fill out this section or attach analysis

ES&H ANALYSIS					
Radiation Concerns		<input checked="" type="checkbox"/> None	<input type="checkbox"/> Activation	<input type="checkbox"/> Airborne	<input type="checkbox"/> Contamination
Radiation Generating Devices:		<input type="checkbox"/> Radiography	<input type="checkbox"/> Moisture Density Gauges	<input type="checkbox"/> Soil Density Gauges	<input type="checkbox"/> X-ray Equipment
<input type="checkbox"/> Special nuclear materials involved, notify Isotope Special Materials Group			<input type="checkbox"/> Fissionable materials involved, notify Laboratory Criticality Officer		
Safety Concerns		<input type="checkbox"/> None	<input type="checkbox"/> Ergonomics	<input type="checkbox"/> Transport of Haz/Rad Material	
<input type="checkbox"/> Adding/Removing Walls or Roofs	<input type="checkbox"/> Confined Space*	<input type="checkbox"/> Explosives	<input type="checkbox"/> Lead*	<input type="checkbox"/> Penetrating Fire Walls	
	<input type="checkbox"/> Corrosive	<input type="checkbox"/> Flammable	<input type="checkbox"/> Magnetic Field*	<input type="checkbox"/> Pressurized Systems	
<input type="checkbox"/> Asbestos*	<input type="checkbox"/> Cryogenic	<input type="checkbox"/> Fumes/Mist/Dust*	<input type="checkbox"/> Material Handling	<input type="checkbox"/> Rigging/Critical Lift	
<input type="checkbox"/> Beryllium*	<input type="checkbox"/> Electrical	<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Noise*	<input type="checkbox"/> Toxic Materials*	
<input type="checkbox"/> Biohazard*	<input checked="" type="checkbox"/> Elevated Work*	<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Non-ionizing Radiation*	<input type="checkbox"/> Vacuum	
<input type="checkbox"/> Chemicals*	<input type="checkbox"/> Excavation	<input type="checkbox"/> Lasers*	<input type="checkbox"/> Oxygen Deficiency*	<input checked="" type="checkbox"/> Other: Working near beampipe	
* Does this work require medical clearance or surveillance from the Occupational Medicine Clinic? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
Environmental Concerns		<input checked="" type="checkbox"/> None	<input type="checkbox"/> Work impacts Environmental Permit No.		
<input type="checkbox"/> Atmospheric Discharges (rad/non-rad)	<input type="checkbox"/> Land Use	<input type="checkbox"/> Soil Activation/contamination	<input type="checkbox"/> Waste-Mixed		
<input type="checkbox"/> Chemical or Rad Material Storage or Use	<input type="checkbox"/> Liquid Discharges	<input type="checkbox"/> Waste-Clean	<input type="checkbox"/> Waste-Radioactive		
<input type="checkbox"/> Cesspools (UIC)	<input type="checkbox"/> Oil/PCB Management	<input type="checkbox"/> Waste-Hazardous	<input type="checkbox"/> Waste-Regulated Medical		
<input type="checkbox"/> High water/power consumption	<input type="checkbox"/> Spill potential	<input type="checkbox"/> Waste-Industrial	<input type="checkbox"/> Underground Duct/Piping		
Waste disposition by:		<input type="checkbox"/> Other			
Pollution Prevention (P2)/Waste Minimization Opportunity:		<input checked="" type="checkbox"/> None <input type="checkbox"/> Yes			
FACILITY CONCERNS		<input checked="" type="checkbox"/> None			
<input type="checkbox"/> Access/Egress Limitations	<input type="checkbox"/> Electrical Noise	<input type="checkbox"/> Potential to Cause a False Alarm		<input type="checkbox"/> Vibrations	
	<input type="checkbox"/> Impacts Facility Use Agreement		<input type="checkbox"/> Temperature Change	<input type="checkbox"/> Other	
<input type="checkbox"/> Configuration Control	<input type="checkbox"/> Maintenance Work on Ventilation Systems		<input type="checkbox"/> Utility Interruptions		
WORK CONTROLS					
Work Practices					
<input type="checkbox"/> None	<input type="checkbox"/> Exhaust Ventilation	<input type="checkbox"/> Lockout/Tagout	<input type="checkbox"/> Spill Containment	<input type="checkbox"/> Security (see Instruction Sheet)	
<input type="checkbox"/> Back-up Person/Watch	<input type="checkbox"/> HP Coverage	<input type="checkbox"/> Posting/Warning Signs	<input type="checkbox"/> Time Limitation	<input type="checkbox"/> Other	
<input type="checkbox"/> Barricades	<input type="checkbox"/> IH Survey	<input type="checkbox"/> Scaffolding-requires inspection	<input type="checkbox"/> Warning Alarm (i.e. "high level")		
Protective Equipment					
<input type="checkbox"/> None	<input type="checkbox"/> Ear Plugs	<input type="checkbox"/> Gloves	<input type="checkbox"/> Lab Coat	<input type="checkbox"/> Safety Glasses	
<input type="checkbox"/> Coveralls	<input type="checkbox"/> Ear Muffs	<input type="checkbox"/> Goggles	<input type="checkbox"/> Respirator	<input type="checkbox"/> Safety Harness	
<input type="checkbox"/> Disposable Clothing	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Shoe Covers	<input type="checkbox"/> Safety Shoes	<input type="checkbox"/> Other
Permits Required (Permits must be valid when job is scheduled.)					
<input checked="" type="checkbox"/> None	<input type="checkbox"/> Cutting/Welding	<input type="checkbox"/> Impair Fire Protection Systems			
<input type="checkbox"/> Concrete/Masonry Penetration	<input type="checkbox"/> Digging/Core Drilling	<input type="checkbox"/> Rad Work Permit-RWP No			
<input type="checkbox"/> Confined Space Entry	<input type="checkbox"/> Electrical Working Hot	<input type="checkbox"/> Other			
Dosimetry/Monitoring					
<input checked="" type="checkbox"/> None	<input type="checkbox"/> Heat Stress Monitor	<input type="checkbox"/> Real Time Monitor	<input type="checkbox"/> TLD		
<input type="checkbox"/> Air Effluent	<input type="checkbox"/> Noise Survey/Dosimeter	<input type="checkbox"/> Self-reading Pencil Dosimeter	<input type="checkbox"/> Waste Characterization		
<input type="checkbox"/> Ground Water	<input type="checkbox"/> O ₂ /Combustible Gas	<input type="checkbox"/> Self-reading Digital Dosimeter	<input type="checkbox"/> Other		
<input type="checkbox"/> Liquid Effluent	<input type="checkbox"/> Passive Vapor Monitor	<input type="checkbox"/> Sorbent Tube/Filter Pump			
Training Requirements (List below specific training requirements)					
Based on analysis above, the Walkdown Team determines the risk, complexity, and coordination ratings below:					
ES&H Risk Level:	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High	WCC: _____ Date: _____	
Complexity Level:	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> High	Service Provider: _____ Date: _____	
Work Coordination:	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High	Authorization to start _____ Date: _____	
(Departmental Sup/WCC/Designee)					

3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)

Work Plan (procedures, timing, equipment, and personnel availability need to be addressed): See attached procedure				
Special Working Conditions Required: None				
Operational Limits Imposed: None				
Post Work Testing Required: No				
Job Safety Analysis Required: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Walkdown Required: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Reviewed by: Primary Reviewer will determine the size of the review team and the other signatures required based on hazards and job complexity. Primary Reviewer signature means that the hazards and risks that could impact ES&H have been identified and will be controlled according to BNL requirements.				
Title	Name (print)	Signature	Life #	Date
Primary Reviewer				
ES&H Professional				
Other				
Other				
Work Control Coordinator	Don Lynch		20146	
Service Provider				
	Review Done: <input type="checkbox"/> in series <input type="checkbox"/> team			

4. Job site personnel fill out this section.

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments).			
Job Supervisor:		Contractor Supervisor:	
Workers:	Life#:	Workers :	Life#:
Workers are encouraged to provide feedback on ES&H concerns or on ideas for improved job work flow. Use feedback form or space below.			

5. Departmental Job Supervisor, Work Control Coordinator/Designee

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)			
Name:	Signature:	Life#:	Date:

6. Departmental Job Supervisor, Work Requester/Designee determines if Post Job Review is required. ☐ Yes ☐ No

Post Job Review (Fill in names of reviewers)			
Name:	Signature:	Life#:	Date:
Name:	Signature:	Life#:	Date:

7. Worker provides feedback.

Worker Feedback (use attached sheets as necessary)	
a) WCM/WCC: Is any feedback required? <input type="checkbox"/> Yes <input type="checkbox"/> No	
b) Workers: Are there better methods or safer ways to perform this job in the future? <input type="checkbox"/> Yes <input type="checkbox"/> No	

8. Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of work area to work supervisor)

Name:	Signature:	Life#:	Date:
Comments:			

**MPC North Detector
PHENIX IR, Bldg. 1008**

Discussion

A new array of detectors has been designed and built for the PHENIX experiment at the Relativistic Heavy Ion Collider. The design concept for the detectors has been reviewed by appropriate PHENIX technical staff and a safety review by CA safety staff has been conducted during which the concept for this work plan was presented.

The detector is comprised by 6 separate enclosures of 2 generic configurations housing a total of 188 lead tungstate crystals 29 of which are housed in each of 4 wedge shaped corner modules and 18 crystals in each of 2 brick shaped central module. The enclosures provide a light tight environment for the detectors which have dry air supplied in an open loop to maintain a uniform thermal environment. On the exterior of the enclosures in the side facing the IP printed circuit boards are attached, from which signal cables and HV/LV power cables are routed from the front end electronics. LED's are mounted on the opposite face (facing away from IP). The front end electronics are mounted on the east side of the MuID North rack ”.

The detector enclosures will be installed empty, 1 at a time by hand. After all empty enclosures are installed, individual detector modules with photodiodes and their holders attached and wrapped in light tight covers, will be stacked into each enclosure. As each enclosure is filled with modules, the cables from the photo diodes will be fit through an array of openings, one per module, in the enclosures front face plate. The face plate will then be attached to the enclosure body. Standoffs will then be mounted and distribution interface printed circuit board attached. This will be repeated until all of the enclosures have been populated, wired, enclosed and interfaced. Finally, flexible piping for dry air supply will be attached and power/signal distribution cabling attached.

This work is to be done by fully trained and experienced PHENIX personnel, under the technical supervision of Sal Marino and the engineering cognizance of Don Lynch (mechanical) and John Haggerty (electrical). The actual mechanical and electrical work requires mechanical/electrical technician skill of the craft to

All persons involved will have appropriate training for working at heights, fall protection and all other relevant training.

Procedure

Caution: During all phases of the work described herein, maintain extreme care at all times to prevent contact with the beam pipe.

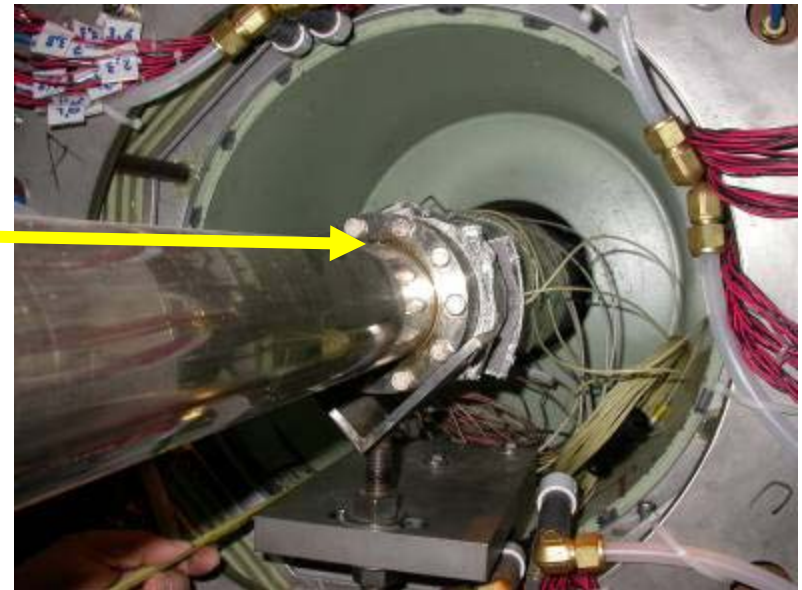
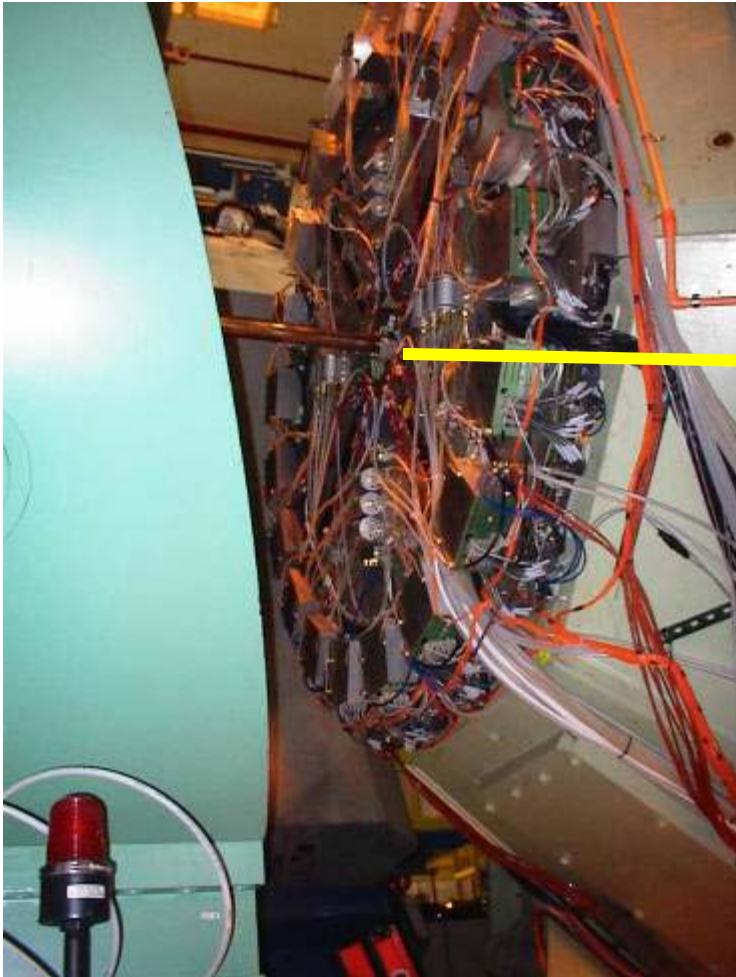
1. LOTO the power to the MMN magnet coil at the power supply in 1008B. (Pearson)
2. Assure that the CM is locked in its southern most position by locking out the hydraulics to each magnet mover. (Marino)
3. Assure that all power to the detector is locked out (Haggerty)

Note: Only PHENIX technicians fully trained and approved for this operation by the cognizant engineers and technical supervisor may operate the articulated arm man lift. A maximum of 2 people may perform the following work in the manlift bucket and a third person shall be in the PHENIX IR, aware of the work being performed, and within communication distance at all times. The passenger in the manlift shall be fully trained as indicated above and shall be approved for this work by the cognizant engineers and technical supervisor.

4. Using the articulated arm manlift, carefully driven to avoid any possibility of contact with adjacent detector components or the beam pipe to access the MMN piston cavity.
5. Insert each of the enclosures individually into the piston cavity by hand in accordance with the sequence and orientation graphically illustrated on the attached sheets.
6. Populate, wire, enclose and interface the individual modules as indicated above. Maintain extreme care at all times to prevent contact with the beam pipe.
7. Align the system to its ultimate position and anchor the assembly at that position.
8. Attach signal and power cables as required and route them into the provided cable tray to the MPC North electronics crate (see attached cable routing plan)
9. After installing, integrating, positioning and aligning the assembly make sure that all tools and any other foreign matter are removed from the piston hole.

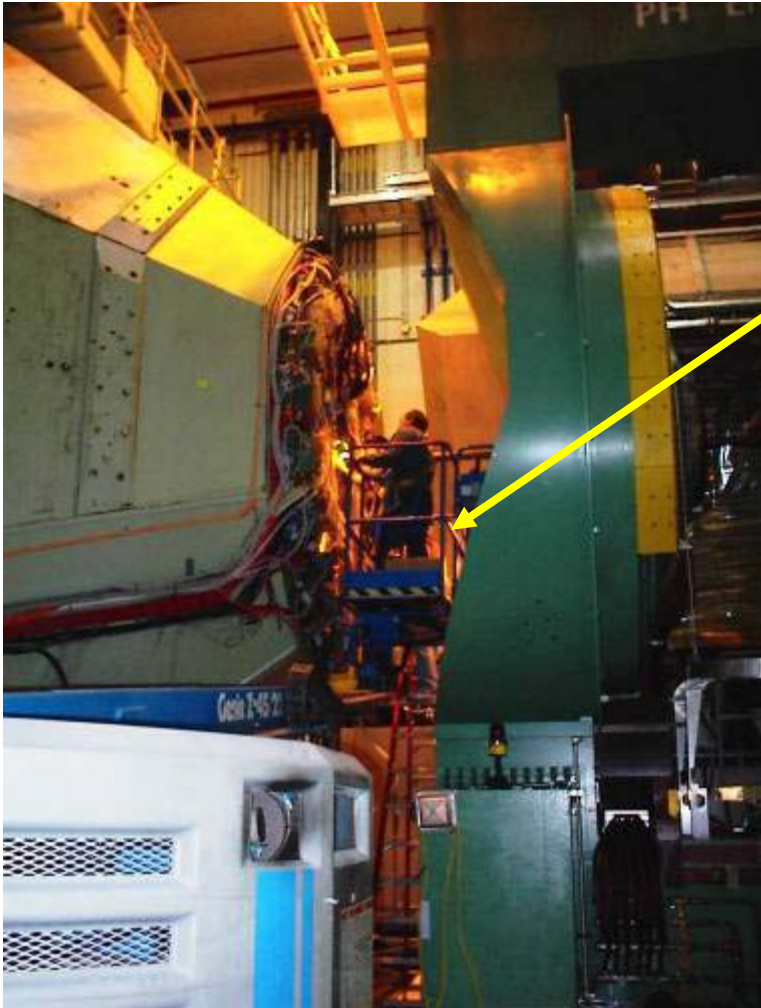
At this point detector re-commissioning may commence.

MPC North will be installed in the Muon Magnet North piston cavity

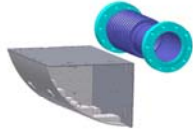


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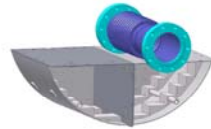
MPC North Assembly



MPC North to be installed from man lift, as South version was.



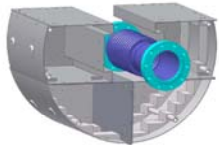
1



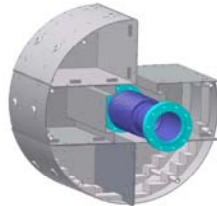
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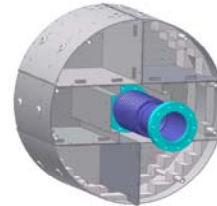
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4



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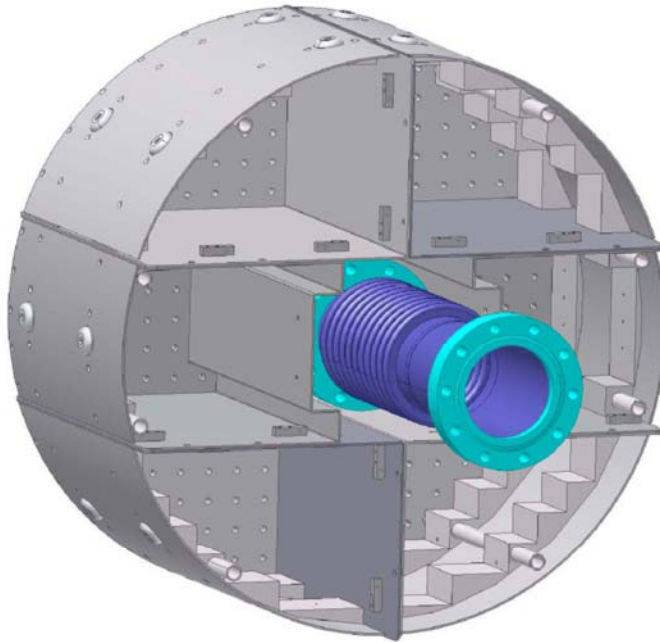
6

Empty sextants are installed first. LED's and LED board are already attached.

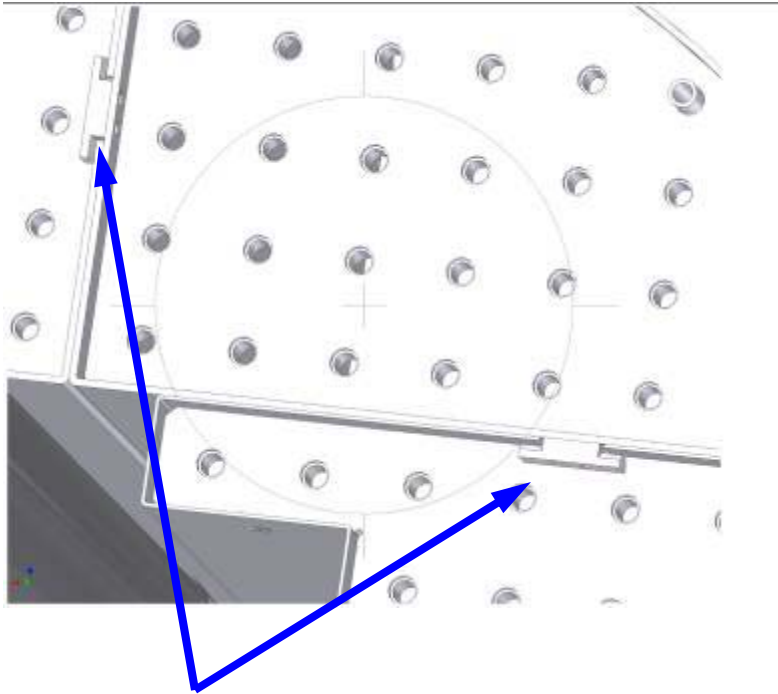
Then modules are individually inserted.

Next APD cable is attached then snaked through cover which is attached.

Finally, standoffs and signal pcbs are attached, wired and routed to MPC N rack.

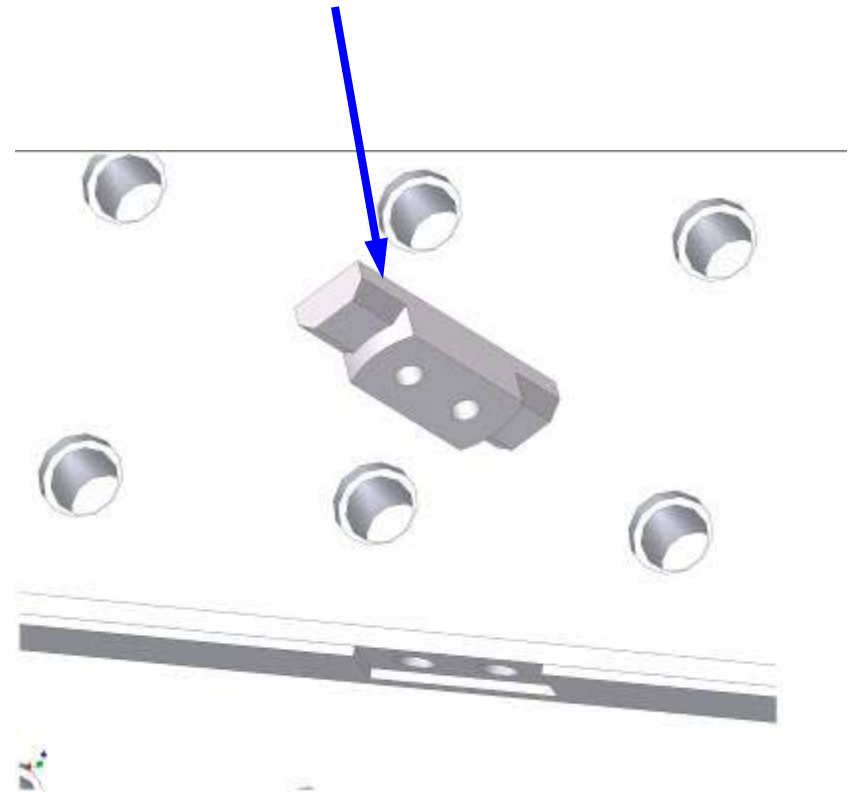


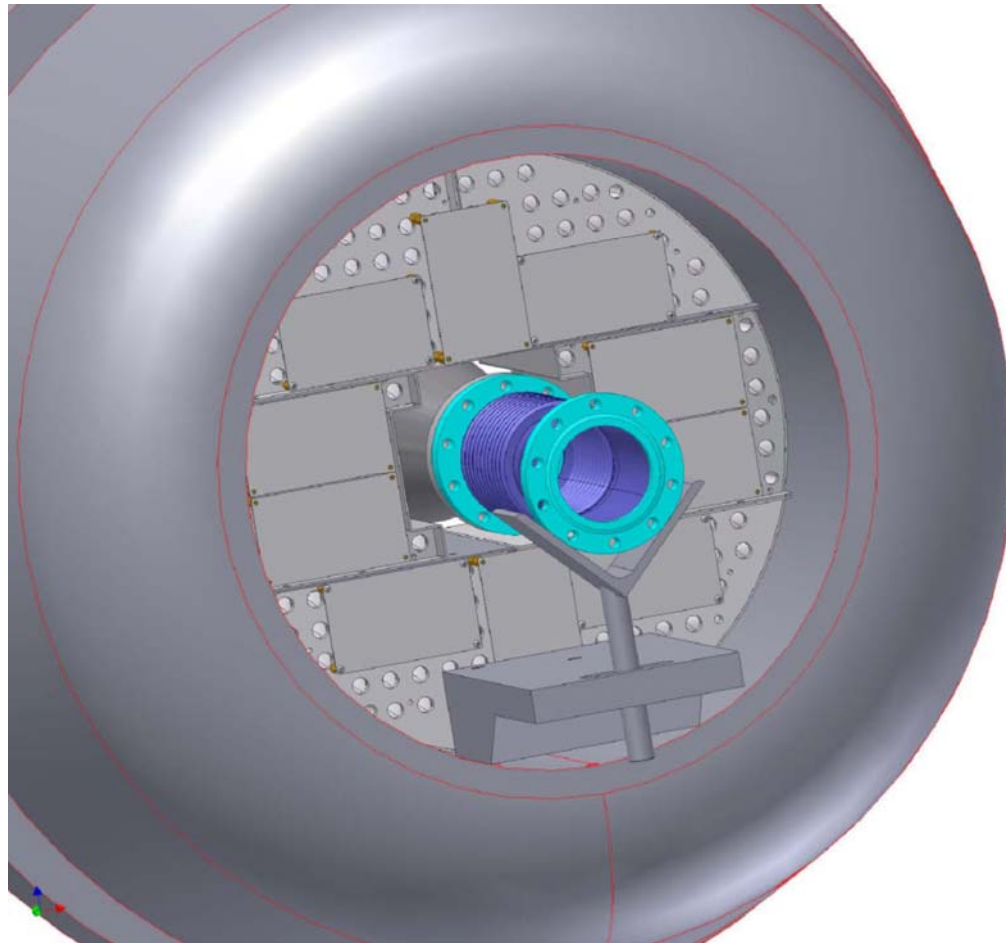
All of the
empty sectors
are installed
before the
crystals are
inserted



Modules interconnect at rear
using tabs as in MPC S

Tabs for MPC N modified for
increase clearance and rounded for
easy locating and self centering





**MPC North mechanical
assembly complete
ready for cabling**

MPC North Cable Routing



Location for MPC N rack
(side of MuID rack)

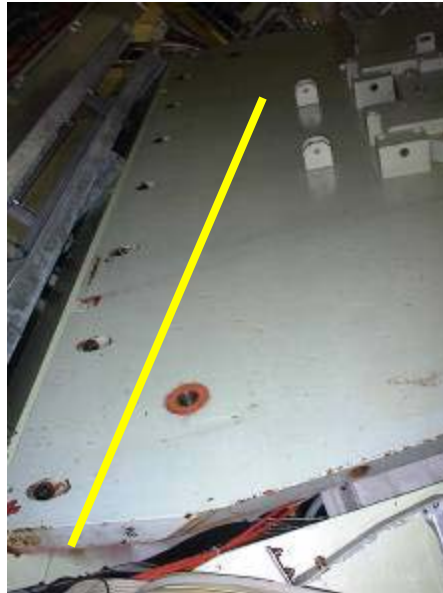
Need to relocate this cable tray

MPC North Cable Routing

1



2



3



4



1. From MuID rack to NMM
2. Up NMM vertical I/shade
3. Over top of NMM to center, then down
4. Under scaffold platform
5. down top lampshade (like MPC S)

5



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MPC North Assembly